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Abstract

Two governance mechanisms employed by organizations to improve the perceptions and usage of their online knowledge repositories among knowledge workers are employing experts to control or edit users' contributions (refereed repositories), and allowing a community of users to review, rate, or edit existing contributions (community wikis). Although these mechanisms are purported to improve the quality of knowledge assets, actual usage of online knowledge repositories still tend to vary widely among organizational employees. The goals of this paper are to understand how the above governance mechanisms influence and/or moderate knowledge repository usage patterns within organizations. To that end, we employ the elaboration-likelihood model from the social psychology literature to derive twelve hypotheses formalizing the main and moderation effects related to organizational knowledge repository usage. An online field experiment is proposed to test these hypotheses. Data collection is in progress, and the final results will be presented at the conference.

Keywords: Knowledge management, Knowledge-based systems, IS innovation, Information technology adoption.

1 INTRODUCTION

Organizations are increasingly implementing knowledge management (KM) systems in order to increase the efficiency and effectiveness of their organizational practices (Davenport et al. 2008). An essential component of these systems is online knowledge repositories that capture experience and insights from many knowledge workers, store them in readily accessible formats for future use, and maintain organizational memory even after the departure of the workers who provided those insights (Alavi and Leidner 2001; Holzner and Marx 1979; Huber 1991). However, such repositories are of little value if they are not appropriately used by future generations of workers for their organizational work. Anecdotal evidence suggests that knowledge workers are sometimes reluctant to use online knowledge repositories because of concerns regarding the quality of the knowledge assets contained in these repositories (Hansen et al. 1999; Pentland 1995). Two currently available approaches that can signal the quality of these knowledge repositories and guide their perceptions among knowledge workers are: (1) using experts or supervisors as referees to control or edit user contributions (e.g., a refereed repository); and (2) using a community of users to review, rate, or edit existing contributions (e.g., a community-driven wiki). Viewing governance as a means of maintaining the quality of knowledge assets in organizational knowledge repositories, the above two approaches are conceptualized in this paper as *expert-governance* and *community-governance* respectively.

Although the governance mechanisms described above are deployed in many organizations, we know very little about how effective they actually are in fostering knowledge usage. The goal of this paper is to compare organizational members' usage of knowledge between expert- and community-governed repositories, and understand the factors that contribute to such usage. We employ the term *knowledge usage* to refer to knowledge workers' retrieving explicit knowledge from online repositories and employing it in performing an organizational task (Nonaka 1994). The specific research questions investigated are: (a) what factors influence knowledge workers' use of knowledge from expert- and community-governed repositories; and (b) how do usage patterns vary between these two types of repositories?

Studying these research questions is important for theoretical and practical reasons. From a theoretical perspective, exploring these questions can help us build better theories of knowledge usage in organizations and thereby contribute to our growing understanding of knowledge management. From a practical perspective, our study may help identify intervention techniques that managers can use to maximize knowledge repository usage (and the relative efficacy of these intervention techniques) within their organizations and their return on investment on KM initiatives.

The rest of this paper is as follows. The next section explores the concept of governance. The third section presents the elaboration likelihood model and examines prior literature concerning knowledge use. The fourth section develops our research model and builds hypotheses regarding the usage of expert- and community-governed repositories. The fifth section discusses research methods currently being used for data collection and analysis in this study, results of which are to be presented at the conference. In the final section, we discuss the study's research and practical implications.

2 THE GOVERNANCE CONCEPT

Kooiman and Bavinck (2005) define governance as "the whole of public as well as private interactions taken to solve societal problems and create societal opportunities" (p.17). This definition views governance as a mechanism intended to solve problems faced by individuals, organizations, or society. Many such mechanisms are described in the sociological literature, two of which most pertinent to our study are hierarchical control and community-governance.

Hierarchical control is a top-down centralized means of governance where policy makers (the state) create and enforce rules and policies for handling citizens' problems. The success of hierarchical control depends on whether this governance can provide citizens with security, fair and equitable treatment, and efficient mobilization of resources (Streeck and Schmitter 1985). Some of the limitations of hierarchical control is that it can create tensions between the state and citizens over privileges received or obligations imposed (Streeck and Schmitter 1985), and that it is susceptible to information asymmetry problems, such as moral hazard and adverse selection, as it is difficult for civil servants to monitor citizens' behaviour or private knowledge (Bowles and Gintis 2002).

In contrast, community-governance is a bottom-up decentralized means of governance where citizens solve problems on their own, rather than relying on state, via autonomous and voluntary efforts. Community-governance takes advantage of the information dispersed among citizens, and is therefore is less susceptible to moral hazard and adverse selection (Bowles and Gintis 2002). However, community-governance has its own share of problems. For instance, it may lead to formation of cliques, which can alienate community members especially if a core group of members treat non-core members as "outsiders" (Streeck and Schmitter 1985), motivate them to leave the community, and strip the community of valuable resources and diversity (Bowles and Gintis 2002; Janis 1982).

The concept of governance is relevant to the management of knowledge repositories because assessing the quality of knowledge assets in such repositories is a salient "problem" faced by knowledge workers that influences their usage of these repositories. Many organizations have attempted to solve this problem using hierarchical control and/or community-governance. In KM, hierarchical control corresponds to expert-governance, where knowledge experts or supervisors act as gatekeepers to ensure that only contributions meeting a minimum quality threshold are published in a knowledge repository. Below-par submissions may be discarded or require one or more rounds of revisions prior to acceptance into the repository. Future change requests and/or revisions to published content can also be subjected to a similar review process. Knowledge quality is ensured by relying heavily on experts' knowledge of the subject matter and control processes that are typically implemented via technologies intended to facilitate the review and oversight process, as well as to store and disseminate the published content.

Alternatively, organizations may employ community-governance, where a community of users autonomously and voluntarily review, rate, and edit published content submitted by their peers as a way of signalling knowledge quality. The design of such repositories is fundamentally different from that of expert-governed repositories in that community-governed repositories must provide technological features that can allow users to easily publish content, as well as allow others to review, edit, and rate content. Further, such repositories should allow for bi-directional information flow between the repository and the user community.

These two modes of governance are neither mutually exclusive, nor exhaustive. It is possible to have hybrid governance mechanisms (combining features from expert- and community-governance), and other modes of governance, such as market-governance and associations (i.e., pacts) (Streeck and Schmitter 1985). Such governance mechanisms are not examined in this study as they are less relevant to the management of online knowledge repositories and less practiced by knowledge-based organizations. The next section presents a theoretical framework for understanding the factors that influence knowledge usage in expert- and community-governed repositories.

3 THEORY AND PRIOR RESEARCH

Elaboration likelihood model (ELM) is a dual-process theory in the social psychology literature that explain how individuals form or change attitudes toward objects, issues, or people (Petty and Cacioppo 1986). This model suggests that there are two alternative "routes" to attitude formation: central and peripheral. In the central route, individuals scrutinize the merits or demerits of available information or arguments about the attitude object before forming an informed judgment. They form

strong attitudes if they perceive the argument as being of high quality. This process, called *elaboration*, is time-consuming, demanding, and effortful on the part of knowledge users. In the peripheral route, individuals rely on cues, such as credibility of the information source, in forming attitudes toward the attitude object. For instance, they may be persuaded by an argument, not because of its merits but because it comes from a credible knowledge source. This route requires less cognitive effort, is fast and automatic, and does not involve elaboration. The central and peripheral routes are commonly operationalized in ELM using the argument quality and source credibility constructs. *Argument quality* refers to the users' perception about the validity, appropriateness, and accuracy of the argument presented regarding the attitude object, while *source credibility* refers to their perceptions of the expertise and trustworthiness of the knowledge source (Pornpitakpan 2004).

ELM also provides conditions under which individuals may invoke the central and peripheral routes to attitude formation. The contingent factor is *elaboration likelihood*, referring to individuals' ability and motivation to elaborate. Individuals with high elaboration likelihood are more likely to employ the central route, since they are more capable of managing the cognitive effort involved in evaluating an argument. Individuals with low elaboration likelihood are more likely to employ the peripheral route, given their lack of the ability and motivation to elaborate, and instead rely on cues for forming judgments. Elaboration likelihood is predominantly operationalized in the ELM literature using subjects' expertise (elaboration ability) and involvement in the subject matter (elaboration motivation).

Subsequent ELM research suggests that central and peripheral routes may not work in isolation but may impact one another. For instance, Slater and Rouner (1996) suggest that it is possible for individuals to evaluate the quality of an argument from the credibility of its source and vice versa. This argument is consistent with dual process theorists' suggestion that individuals have an innate desire to achieve congruency between the responses generated by central and peripheral routes (Festinger 1957; Gawronski and Bodenhausen 2006; Sloman 1996). Incongruent responses create cognitive discomfort, which may lead individuals to update one of the responses to make it compatible with the other. For example, individuals facing two conflicting responses about an argument (e.g., the source is credible but the argument is of low quality) can justify their favourable attitudes toward that argument by making themselves believe that the argument is of high quality since it comes from a credible source, or that the source is less credible than initially thought. In this case, individuals rationalize their decision by updating the response generated by the central or peripheral route.

There have been a few prior applications of ELM to KM research. Mak et al. (1997) conducted an experiment to investigate users' acceptance of an expert system's recommendations. Their findings supported ELM's predictions that users in the high elaboration state accept recommendations through critical thinking, whereas those in the low elaboration state accept recommendations if these recommendations come from credible experts. Dijkstra (Dijkstra 1995; Dijkstra 1999; Dijkstra et al. 1998) conducted three experiments to examine the persuasiveness of an expert system. In the first two experiments, Dijkstra (1995; 1998) observed that subjects perceived an expert system as being more persuasive than humans even though both sources gave the same advice, suggesting that elaboration likelihood did not matter in determining the persuasiveness of an expert system. In the third experiment however, Dijkstra (1999) reported that subjects who disagreed with incorrect advice provided by the expert system engaged in critical thinking, while those who agreed relied on cues.

Sussman and Siegal (2003) employed ELM to investigate how consultants at a public accounting firm adopt information provided in electronic mails. They reported that argument quality and source credibility were positively related to consultants' perceived usefulness of information and their subsequent self-reported adoption of that information, and that elaboration likelihood also moderated the effects of argument quality and source credibility, as expected from ELM. Fadel et al. (2008) employed an experimental study using a mock knowledge repository for recommending Internet authentication solutions to investigate whether perceived information usefulness leads to information adoption. In addition to ELM constructs, they added another peripheral route construct to account for information validation in repositories. However, they failed to support ELM's predictions, although they observed that validation of information was positively related to its perceived usefulness.

Using an alternative dual-process model, the Heuristic-Systematic Model (HSM; Chaiken 1980), Zhang and Watts (2008) investigated how individuals adopt information from online communities. Similar to ELM, they operationalized systematic processing using argument quality and heuristic processing using source credibility, which were moderated by disconfirming information and focused search in order to account for HSM's attenuation effects. Studying two discussion forums, they found argument quality and source credibility to influence information adoption, but observed mixed support for the moderating impacts of disconfirming information and focused search.

Two key insights can be generated from the above research. First, individuals are more likely to use knowledge if they find the knowledge to be of high quality and the source to be credible. Second, argument quality and source credibility can have varying effects on knowledge use contingent on individuals' elaboration likelihood. However, the literature overlooks governance mechanisms that are increasingly being used to influence user attitudes toward knowledge repositories. An examination of the study context referenced in prior studies (Table 1) indicates that the literature has examined either expert-governed or community-governed repositories, but not both, and more importantly, have not drawn a distinction between these alternative modes of governance. This study aims to address this gap in the extant literature by focusing on the effects of these two governance mechanism on the usage of knowledge repositories.

Type of repository Governance mechanism	<i>Organizational</i>	<i>Non-organizational</i>
<i>Expert-governance</i>	Dijkstra (1995) Mak et al. (1997) Dijkstra et al. (1998) Dijkstra (1999)	Fadel et al. (2008)
<i>Community-governance</i>	(-)	Zhang and Watts (2008)
<i>No governance</i>	Sussman and Siegal (2003)	(-)

Table 1. Classification of prior studies by governance context

4 RESEARCH MODEL

Given its focus on attitude formation, ELM employs attitude as the primary dependent variable of interest. To apply this model to our specific context, we first extend the dependent variable to knowledge repository usage. Prior research on attitude formation and change suggest that individuals' attitudes toward an attitude object are manifested in their intentions regarding that object, which subsequently influences their behaviour regarding that object (e.g., Petty et al. 1983). Although some researchers (e.g., Ajzen and Fishbein 1980) draw a distinction between attitude and intention, technology acceptance research (e.g., Venkatesh et al. 2003) views attitudes as being embedded in and redundant with intentions. Consistent with the later stream of research, we represent attitude as knowledge workers to use that knowledge asset, which is purported to influence usage knowledge usage behaviour in a positive manner. This expectation, illustrated in our research model in Figure 1, leads to our first hypothesis:

H1: Users' intention to use (a) expert-governed or (b) community-governed knowledge assets is positively related to their actual usage of those knowledge assets.

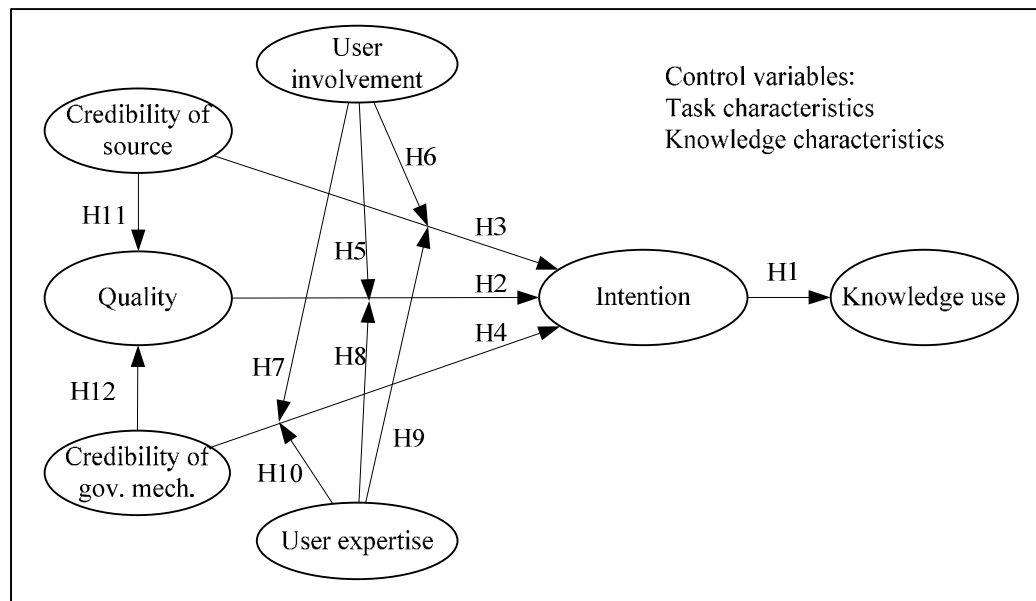


Figure 1. Research Model

Based on ELM, we infer that one's attitude toward a knowledge asset is determined jointly by his/her perceptions of quality of that knowledge (the central route) and the credibility of the knowledge source (the peripheral route). If knowledge workers are provided with high-quality knowledge, they'll have favourable attitudes toward that knowledge regardless of the type of governance mechanism used in the knowledge repository. Likewise, knowledge coming from a credible source is more likely to induce favourable attitudes among individuals than knowledge coming from less credible sources, regardless of the type of governance mechanism used in the repository. These expectations lead us to hypothesize:

H2: Quality of (a) expert-governed or (b) community-governed knowledge assets is positively related to users' intention to use those knowledge assets.

H3: Credibility of source is positively related to users' intention to use (a) expert-governed or (b) community-governed knowledge assets.

The presence of governance mechanisms introduces an additional peripheral cue, the *credibility of the governance mechanism*, referring to knowledge workers' perceptions of the adequacy of expert or community governance for improving knowledge quality in online repositories. If knowledge workers find these governance mechanisms credible, they can still have positive attitudes toward this knowledge, even if they have little information about the credibility of the knowledge source or are unable to adequately assess knowledge quality. In contrast, if they don't perceive the governance mechanisms as being credible, this perception can undermine their attitude toward knowledge derived from these repositories. Therefore, we propose:

H4: Credibility of (a) expert-governance or (b) community-governance is positively related to intention to use knowledge assets.

As discussed earlier, the central and peripheral routes to attitude formation may be moderated by the elaboration likelihood of knowledge users. Individuals possessing the motivation and ability to elaborate tend to rely more on central route and carefully scrutinize the merits or demerits of knowledge assets (i.e., argument quality); whereas if they lack elaboration motivation or ability, they must rely on peripheral cues such as credibility of knowledge source or of the governance mechanism. It should be noted that elaboration is not a personality trait, but rather a situational state that depends

on the subjects' prior expertise of and exposure to the attitude object. For instance, a physician may elaborate medical arguments because such arguments are related to his/her profession and he/she has the ability to process such arguments, but not elaborate arguments about automotive repair when his/her car breaks down. Drawing from this example, elaboration motivation and ability can be conceptualized as *user involvement* and *user expertise* respectively. User involvement and expertise often tend to be positively correlated, but not necessarily so, because a novice knowledge worker may be deeply involved in a task context, yet lack the expertise of a senior worker in understanding the complexities of that task. Knowledge users with high involvement and high expertise will tend to develop more favourable attitudes toward knowledge assets when presented with high quality arguments, while those with low involvement and low expertise will have more favourable attitudes when presented with a highly credible source or a governance mechanism of high credibility. These expectations lead to the following moderating effects:

- H5: User involvement positively moderates the relationship between quality of (a) expert-governed or (b) community-governed knowledge assets and intention to use knowledge assets.*
- H6: User involvement negatively moderates the relationship between credibility of source and intention to use (a) expert-governed or (b) community-governed knowledge assets.*
- H7: User involvement negatively moderates the relationship between credibility of governance mechanism and intention to use (a) expert-governed or (b) community-governed knowledge assets.*
- H8: User expertise positively moderates the relationship between quality of (a) expert-governed or (b) community-governed knowledge assets and intention to use knowledge assets.*
- H9: User expertise negatively moderates the relationship between credibility of source and intention to use (a) expert-governed or (b) community-governed knowledge assets.*
- H10: User expertise negatively moderates the relationship between credibility of governance mechanism and intention to use (a) expert-governed or (b) community-governed knowledge assets.*

Although ELM states that central and peripheral routes work independently, subsequent studies have suggested that these routes may influence each other. Slater and Rouner (1996) argue that knowledge coming from a credible source may be viewed as being of high argument quality. Conversely, an unknown source can be viewed as being credible if arguments provided by this source are deemed to be of high quality. However, in any given instance, peripheral cues are more likely to influence the central route rather than vice versa. This is because peripheral route relies on a slow-learning system in which associating a response with a particular cue requires individuals to be repeatedly exposed to that cue over an extended period of time (Smith and DeCoster 2000). For example, individual A can perceive individual B as credible only after A interacts with B numerous times. Once created, such perception is stable and unlikely to change unless something remarkable occurs to engender a change. In this case, A will not likely change his/her perceptions of B with every interaction, because doing so will impose a significant information processing load on A and can also cause cognitive dissonance due to the temporal instability of knowledge (Smith and DeCoster 2000). For this reason, central route processing is less likely to influence peripheral cues, as any such possible impact will be spread across time. Hence, credibility of source and the governance mechanism should influence knowledge quality, rather than the reverse, at any given instant of time. Therefore, we propose:

- H11: Credibility of source that is positively related to the quality of (a) expert-governed or (b) community-governed knowledge assets.*
- H12: Credibility of governance mechanism is positively related to the quality of (a) expert-governed or (b) community-governed knowledge assets.*

5 RESEARCH METHODS

5.1 Experimental Design

The proposed hypotheses will be validated using an online field experiment at a major auditing and consulting firm. A three-group, post-test only, randomized design will be employed, with a targeted sample of 120 professionals randomly assigned into three groups: no-governance, expert-governance, and community-governance. The no-governance group will be used as a control group, to measure the relative impact of expert- and community-governance on knowledge workers' perceptions.

In this experiment, professionals will perform an experimental task that requires their use of a knowledge asset provided in the form of a document. Although all professionals will receive the same document, the treatment will be manipulated as follows: the no-governance group will be informed that the document was obtained from the personal blog of another professional, the expert-governance group will be told that the document was vetted by domain experts, while the community-governance group will be told that the document is obtained from the organizational wiki, where it was edited by other users in the same organization. Source credibility will be measured but not manipulated.

After reading the document, participants will fill-out a questionnaire that will capture their perceptions of knowledge quality, credibility of source, credibility of governance mechanism, user expertise, user involvement, user attitude toward the knowledge, and user intention to use knowledge. Participants will then be asked to perform the experimental task using the suggestions, following which their knowledge usage behaviour will be measured. The experimental task and the questionnaire will be administered in an online format.

5.2 Operationalization of Constructs

All constructs of interest to this study will be measured using pre-validated instruments from prior research, and modified to fit the current context of knowledge usage. Table 2 presents the individual items used for each construct and the studies they are adapted from.

Knowledge use, the dependent variable, will be measured as the degree to which participants apply the suggestions in the document to perform the experimental task. This construct will be measured using a continuous (rather than binary) scale to allow for greater statistical power. Knowledge quality and source credibility will each be measured using multiple-item semantic differential scales taken from Sussman and Siegal (2003). Since prior research has not examined the credibility of governance mechanism, this construct will be measured using a modification of Sussman and Siegal's (2003) source credibility construct, as shown in Table 2. User expertise and user involvement will be measured using scales derived from Sussman and Siegal (2003) and Zaichkowsky (1985) respectively. Attitude will be measured using Petty et al.'s (1983) three-item semantic differential scale, while the intention to use knowledge scale is adapted from Ajzen (2002).

5.3 Data Analysis

Empirical data from this field experiment will be analyzed using Partial Least Squares (PLS). PLS is chosen because it imposes fewer restrictions on sample distributions than covariance-based structural equation modeling. Two different models will be tested using PLS (one for expert-governance and another for community-governance) to test hypotheses H1-H12.

Knowledge Quality: (adapted from Sussman and Siegal 2003)									
This document is _____.									
KQ1	Complete	1	2	3	4	5	6	7	Incomplete
KQ2	Consistent	1	2	3	4	5	6	7	Inconsistent
KQ3	Accurate	1	2	3	4	5	6	7	Inaccurate
Source Credibility: (adapted from Sussman and Siegal 2003)									
The person providing this document is _____ on this topic.									
CS1	Not knowledgeable	1	2	3	4	5	6		Knowledgeable
CS2	Not expert	1	2	3	4	5	6		Expert
CS3	Not trustworthy	1	2	3	4	5	6		Trustworthy
CS4	Not reliable	1	2	3	4	5	6		Reliable
Credibility of expert-governance: (adapted from Sussman and Siegal 2003)									
Experts vetted this document is _____ on this topic.									
CEG1	Not knowledgeable	1	2	3	4	5	6		Knowledgeable
CEG2	Not expert	1	2	3	4	5	6		Expert
CEG3	Not trustworthy	1	2	3	4	5	6		Trustworthy
CEG4	Not reliable	1	2	3	4	5	6		Reliable
Credibility of community-governance (adapted from Sussman and Siegal 2003)									
Other professionals edited this document are _____ on this topic.									
CCG1	Not knowledgeable	1	2	3	4	5	6		Knowledgeable
CCG2	Not expert	1	2	3	4	5	6		Expert
CCG3	Not trustworthy	1	2	3	4	5	6		Trustworthy
CCG4	Not reliable	1	2	3	4	5	6		Reliable
User Expertise: (adapted from Sussman and Siegal 2003)									
UE1	How informed are you on the subject matter of this issue?								
	Novice	1	2	3	4	5	6	7	Expert
UE2	To what extent are you an expert on this topic?								
	Not at all	1	2	3	4	5	6	7	To a great extent
User Involvement: (adapted from Zaichkowsky 1985)									
This document is _____ for me.									
UI1	Not important	1	2	3	4	5	6	7	Important
UI2	Of no concern	1	2	3	4	5	6	7	Of concern
UI3	Irrelevant	1	2	3	4	5	6	7	Relevant
Intention: (adapted from Ajzen 2002)									
I _____ to use this knowledge for [performing the experimental task]									
I1	Don't intend	1	2	3	4	5	6	7	Intend
I2	Won't try	1	2	3	4	5	6	7	Try
I3	Don't plan	1	2	3	4	5	6	7	Plan
Knowledge Use:									
$(\text{number of suggestions used}) / (\text{number of total suggestions}) \times 100$									

Table 2. Measurement Items

Follow-up ANCOVA analysis will be conducted to compare knowledge quality, source credibility, attitude, intention, and knowledge use across the three groups, using user expertise and user involvement as covariates. Variable means in the no-governance group will be treated as the base level and will be compared to that in the expert- and community-governance groups. Expert- and community-governance groups will also be compared against each other to generate more insights about governance mechanisms and user perception of these mechanisms.

6 CONCLUSION

In summary, the goal of this paper is to investigate the role of two governance mechanisms on knowledge workers' use of organizational knowledge repositories. The research questions explored are: (a) what factors influence knowledge workers' use of knowledge from expert- and community-governed repositories; and (b) how do usage patterns vary between these two types of repositories? To answer these questions, we draw from the elaboration likelihood model to formulate twelve hypotheses for empirical testing. Our research model suggests that knowledge workers' use of knowledge from a repository is governed by their intentions to use that knowledge, which in turn, is determined by central route (knowledge quality), and peripheral route (source credibility and credibility of governance mechanism) processing. Furthermore, individuals' elaboration likelihood (operationalized as user involvement and expertise) determines whether they rely more on the central or the peripheral route.

The next step of our research is the design of an experimental task to test our hypotheses. After pre- and pilot-tests, we will roll out the experiment at a major auditing and consulting firm that is currently using expert- and community-governance in two separate knowledge repositories. When completed, this study will be one of the first to empirically examine the role of governance mechanisms within the context of knowledge repository use in organizations.

This paper will shed light on the relationship between governance mechanism and people's use of knowledge from organizational repositories. Although governance mechanisms are quite prevalent in organizations, we know of no theories that explain their efficacy in promoting knowledge usage or empirical study that have compared these mechanisms. Further, we extend the elaboration likelihood model by introducing a new peripheral construct in credibility of governance mechanism that may be salient in certain contexts such as knowledge management.

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